

Effectiveness of paramedic practitioners in attending 999 calls from elderly people in the community: cluster randomised controlled trial

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ABSTRACT

Objective To evaluate the benefits of paramedic practitioners assessing and, when possible, treating older people in the community after minor injury or illness. Paramedic practitioners have been trained with extended skills to assess, treat, and discharge older patients with minor acute conditions in the community.

Design Cluster randomised controlled trial involving 56 clusters. Weeks were randomised to the paramedic practitioner service being active (intervention) or inactive (control) when the standard 999 service was available.

Setting A large urban area in England.

Participants 3018 patients aged over 60 who called the emergency services (n=1549 intervention, n=1469 control).

Main outcome measures Emergency department attendance or hospital admission between 0 and 28 days; interval from time of call to time of discharge; patients' satisfaction with the service received.

Results Overall, patients in the intervention group were less likely to attend an emergency department (relative risk 0.72, 95% confidence interval 0.68 to 0.75) or require hospital admission within 28 days (0.87, 0.81 to 0.94) and experienced a shorter total episode time (235 v 278 minutes, 95% confidence interval for difference -60 minutes to -25 minutes). Patients in the intervention group were more likely to report being highly satisfied with their healthcare episode (relative risk 1.16, 1.09 to 1.23). There was no significant difference in 28 day mortality (0.87, 0.63 to 1.21).

Conclusions Paramedics with extended skills can provide a clinically effective alternative to standard ambulance transfer and treatment in an emergency department for older patients with acute minor conditions.

Trial registration ISRCTN27796329.

INTRODUCTION

The introduction of new models of care, including further assessment, triage, and treatment skills for paramedics, has been recommended to help manage ever increasing demands for health care.¹ Current evidence concerning safety, effectiveness, and costs to support these changes in practice is lacking.²

Paramedics can be trained to assess and treat or refer patients with conditions such as wounds,³

hypoglycaemia,⁴ and falls.⁵ The merits of a pre-hospital practitioner in fulfilling a broader public health and primary care outreach role in the local community have also been discussed.⁶ Other authors, however, have cast doubt on the safety, feasibility, and cost effectiveness of paramedics assessing and treating apparently minor problems in the community.^{7,8}

Elderly people make 12-21% of visits to emergency departments. Many of them attend after an accident or fall.^{9,10} Recently completed studies suggest that an alternative approach to an emergency ambulance response would have the greatest chance of improving patients' experience and reducing demand.^{11,12} The South Yorkshire Ambulance Service developed the paramedic practitioner in older people's support (PPOPS) scheme to deliver patient centred care to elderly people who call the emergency services with conditions triaged as not immediately life threatening.

We conducted a cluster randomised controlled trial to evaluate the effectiveness and safety of this new service.

METHODS

Seven experienced paramedics completed training to enable them to provide community based clinical assessment and treatment for patients aged over 60 who contacted the emergency ambulance service with minor acute conditions. Operational between the hours of 8 am and 8 pm, the service was activated by a 999 call or an urgent call from a general practitioner. Initial assessment and treatment was delivered within the patient's residence. When necessary, patients were transported to an emergency department for further assessment or treatment.¹³ The box outlines the scope of practice.

Patients aged 60 and above who called from a Sheffield postcode were recruited from 1 September 2003 to 26 September 2004. We used cluster randomisation to reduce the risk of contamination and to allow service level evaluation of the intervention. Weeks were randomised to the paramedic practitioner service being active (intervention) or inactive (control), when the standard 999 service was available.

Principal outcomes in the study protocol were attendance at emergency department and hospital admission between 0 and 28 days, interval from time of call to time

Scope of practice of paramedic practitioners

Presenting complaint

- Falls
- Lacerations
- Epistaxis
- Minor burns
- Foreign body in ear, nose, or throat

Practical skills

- Local anaesthetic techniques
- Wound care and suturing techniques
- Principles of dressings and splintage

Special skills

- Joint examination
- Examination of neurological, cardiovascular, and respiratory system
- Examination of ear, nose, and throat
- Protocol led dispensing: simple analgesia, antibiotics, tetanus toxoid
- Assessment of mobility and social needs

Additional options for referral and requesting investigations

- Requests for radiography
- Referral processes: emergency department, general practitioner, district nurse, community social services

of discharge, and patients' satisfaction with the service received. Secondary outcomes were investigations and treatments prescribed, subsequent use of health services within 28 days, and health status and mortality at 28 days.

Data collection

We used the emergency department or ambulance service records to collect clinical data relating to the initial patient episode. Total episode time was derived by calculating the interval between the time the initial call was received to the time that the patient left the emergency department or was admitted to hospital, or when the paramedic practitioner or ambulance crew left the scene.

We used hospital records to collect information about unplanned hospital attendances or admissions within Sheffield in the 28 days after the initial episode and mortality at 28 days. Information relating to subsequent ambulance requests was collected from the local ambulance service. Follow-up was by postal questionnaire at three and 28 days after the incident.

Statistical analysis

Analysis was by randomisation, on an intention to treat basis. During the intervention weeks, if a paramedic practitioner was unavailable patients were attended by a standard emergency ambulance response. During the control weeks, identified patients were attended and treated according to standard practice.

RESULTS

Trial numbers—During the trial, the paramedic practitioners identified 96% (3996/4175) of all eligible calls at the time of the incident. Of the patients identified, 978 patients did not consent to participate, resulting in the inclusion of 3018 patients into the trial. Most of these patients presented after a fall (2682/3018, 89%). There were no significant differences between the baseline demographics of those who were recruited and those who were not. During intervention weeks most patients (n=1090) received the intended service. The other patients received the standard ambulance response. During control weeks all patients received a standard ambulance response (n=1234). There were no differences between groups in terms of demographics or presenting complaint (table 1).

Primary outcomes—Patients in the intervention group were less likely to have attended an emergency department either during the initial episode (day 0) or in the next 28 days (62.6% v 87.5%, $P<0.001$). They were also less likely to have required a hospital admission during the same time period (40.4% v 46.5%, $P<0.001$) (table 2). Respondents in the intervention group were more likely to report being "very satisfied" than those in the control group (85.5% v 73.8%, $P<0.001$). On average, patients in the intervention group experienced a shorter total episode time by around 42 minutes (235 v 278 minutes, $P<0.001$).

Secondary outcomes—Investigations received by patients during the trial included radiography, blood and urine tests, and electrocardiography. Patients in intervention weeks were less likely to undergo investigation (49.7% v 67.9%, $P<0.001$) but were more likely to receive treatment, including advice (81.3% v 72.8%, $P<0.001$). Patients in the intervention group, however, were more likely to have subsequent unplanned contact with secondary care services in the 28 days after their initial episode (21.3% v 17.6%, $P<0.01$). They were also less likely to report that their physical health had worsened compared with those in the control group (21.7% v 25.6%, $P=0.13$). There was no significant differences in health outcomes between the two groups. There were no significant differences between the two groups in terms of mortality.

DISCUSSION

This randomised controlled trial evaluated the impact of paramedics with extended skills managing patients with acute minor conditions. The service conveyed considerable benefits in terms of reduced overall attendances at an emergency department and admissions to hospital, shorter episode times, and higher levels of satisfaction among patients. We identified no differences in mortality or health outcomes after 28 days.

Table 1 | Baseline characteristics of recruited patients. Figures are numbers (percentages) of patients unless stated otherwise

	Intervention (n=1549)	Control (n=1469)	Total (n=3018)
Women	1115 (72.0)	1077 (73.3)	2192 (72.6)
Mean (SD) age (years)	82.6 (8.3)	82.5 (8.3)	82.6 (8.3)
Living in own home	1209 (78.1)	1139 (77.5)	2348 (77.8)
Incident occurred at usual residence	1336 (86.2)	1234 (84.0)	2570 (85.5)
Presenting complaint:			
Fall	1369 (88.4)	1313 (89.4)	2682 (88.9)
Haemorrhage	93 (6.0)	78 (5.3)	171 (5.7)
Acute medical condition	86 (5.6)	78 (5.3)	164 (5.4)

Table 2 | Primary and secondary outcomes in patients seen by paramedic practitioners or not. Figures are numbers (percentages) unless stated otherwise

	Intervention weeks	Control weeks	Relative risk (95% CI)	P value	ICC
Primary outcomes					
ED attendance 0-28 days (n=3018)	970 (62.6)	1286 (87.5)	0.72 (0.68 to 0.75)	<0.001	0.00
Hospital admission 0-28 days (n=3018)	626 (40.4)	683 (46.5)	0.87 (0.81 to 0.94)	<0.001	0.00
Very satisfied with care (n=1482)	656 (85.5)	528 (73.8)	1.16 (1.09 to 1.23)	<0.001	0.00
Mean (SD) total episode time (min) (n=2968)	235.1 (183.3)	277.8 (182.6)	-42.2 (8.8)* (-59.5 to -25.0)	<0.001	—
Secondary outcomes					
Investigation at initial episode (n=2946)	754 (49.7)	971 (67.9)	0.73 (0.69 to 0.78)	<0.001	0.00
Treatment initial at episode (n=2946)	1233 (81.3)	1040 (72.8)	1.11 (1.06 to 1.17)	<0.001	0.00
Subsequent unplanned contact with secondary care after initial episode (n=3018)	330 (21.3)	259 (17.6)	1.21 (1.06 to 1.38)	<0.01	0.00
Physical health worse (n=1430)	166 (21.7)	170 (25.6)	0.85 (0.69 to 1.05)	0.13	0.00
Mortality at 28 days (n=3018)	68 (4.4)	74 (5.0)	0.87 (0.63 to 1.21)	0.41	0.00

ICC=intra-class correlation; ED=emergency department.
*Difference (SE).

More than a quarter (29.6%, n=459) of patients in the intervention group did not receive the paramedic practitioner service. These patients received the “normal service” but were included in the “intervention” group as the results were analysed on an intention to treat basis.¹⁴ This had the effect of weakening the impact of the intervention.

The patients in this trial were categorised as having “minor” conditions at their initial contact with the emergency services. The most common presenting complaint was a fall. Within 28 days of the initial call, however, over 40% had required a hospital admission and 5% had died. None the less, the service seemed to manage the risk appropriately.

More work is required to enable identification of patients who can benefit from this level of care.^{15 16} Some emergency care practitioner schemes are targeted at different populations and thus the results of this study may not be fully transferable.

Limitations

This large open pragmatic trial has some limitations because of differences in recruitment of patients and response rates to follow-up questionnaires between the groups. Of the 3996 patients randomised to the trial, only 2293 agreed to receive a questionnaire. This was mainly because of the proportion of patients with cognitive impairment. Of the 2293 patients, 1482 (64.6%) responded, which is less than the number we calculated we needed (n=2200). The intervention effects on the primary outcomes, however, were sufficiently large for us to be confident that the effects are real.

WHAT IS ALREADY KNOWN ON THIS TOPIC

Paramedics can be trained to manage certain medical conditions outside hospital
They have also been trained to make triage decisions

WHAT THIS STUDY ADDS

Paramedics can be trained to see and treat elderly people with acute minor conditions and reduce the need for emergency department attendance by almost 25%
Patients find this approach more satisfactory than attending the emergency department

The study was conducted in one large urban area of the UK so the generalisability of these results should be treated with some caution. However, we think that there was nothing unique about the patients or presenting complaints.

Summary

Paramedics with extended skills working in the community can provide a clinically effective alternative to standard ambulance transfer and treatment in an emergency department for elderly patients with acute minor conditions.

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Occupational therapy for patients with problems in personal activities of daily living after stroke: systematic review of randomised trials

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ABSTRACT

Objective To determine whether occupational therapy focused specifically on personal activities of daily living improves recovery for patients after stroke.

Design Systematic review and meta-analysis.

Data sources The Cochrane stroke group trials register, the Cochrane central register of controlled trials, Medline, Embase, CINAHL, PsycLIT, AMED, Wilson Social Sciences Abstracts, Science Citation Index, Social Science Citation, Arts and Humanities Citation Index, Dissertations Abstracts register, Occupational Therapy Research Index, scanning reference lists, personal communication with authors, and hand searching.

Review methods Trials were included if they evaluated the effect of occupational therapy focused on practice of personal activities of daily living or where performance in such activities was the target of the occupational therapy intervention in a stroke population. Original data were sought from trialists. Two reviewers independently reviewed each trial for methodological quality. Disagreements were resolved by consensus.

Results Nine randomised controlled trials including 1258 participants met the inclusion criteria. Occupational therapy delivered to patients after stroke and targeted towards personal activities of daily living increased performance scores (standardised mean difference 0.18, 95% confidence interval 0.04 to 0.32, P=0.01) and reduced the risk of poor outcome (death, deterioration or dependency in personal activities of daily living) (odds ratio 0.67, 95% confidence interval 0.51 to 0.87, P=0.003). For every 100 people who received occupational therapy focused on personal activities of daily living, 11 (95% confidence interval 7 to 30) would be spared a poor outcome.

Conclusions Occupational therapy focused on improving personal activities of daily living after stroke can improve performance and reduce the risk of deterioration in these abilities. Focused occupational therapy should be available to everyone who has had a stroke.

INTRODUCTION

Stroke is the second leading cause of death in the world and the leading cause of serious, long term disability in adults; about half of those who survive are dependent on others for assistance with personal activities of daily living six months after the stroke.^{1,2}

Personal activities of daily living are necessary for survival and include "those tasks which all of us undertake every day of our lives in order to maintain our level of care"³ such as feeding, dressing, toileting, grooming, transferring, and mobilising.⁴

We conducted a systematic review to test the hypothesis that occupational therapy aimed at encouraging people to participate in personal activities of daily living after stroke will improve the recovery of ability to perform such activities.

METHODS

Eligibility criteria

We sought any randomised controlled trials that compared an occupational therapy intervention focused on activities of daily living with no routine input as the control intervention. The interventions had to be delivered by, or under the supervision of, a qualified occupational therapist. Our primary outcome of interest was independence in personal activities of daily living at the end of scheduled follow-up. The second primary outcome of interest was the extent to which participants had poor outcome, defined as death or deterioration of ability or dependency in personal activities of daily living. Secondary outcomes were death, institutionalisation, extended personal activities of daily living necessary for maintaining a dwelling in a given socio-cultural setting (for example, preparing own meals, doing light housework, managing own money, shopping for personal items), patients' mood and quality of life, carers' mood and quality of life, and patients' and carers' satisfaction with services.

Search strategy and data extraction

We followed the search strategy developed for the stroke group of the Cochrane collaboration.⁵ Further details